22nd International Symposium on Rarefied Gas Dynamics

DockSide Convention Centre, Darling Harbour, Sydney

Sunday 9th July

16:00 to 18:00 ***Darling*** **Early Registration and Welcome Party**

Monday 10th July

08:30 ***Reception Area*** **Registration**

09:30 ***Cockle Bay*** **Grad Lecture** (Chair: G.A. Bird)

Reflections on the Boltzmann Equation, B.J. Alder (1)

10:30 ***Morning Break Darling Rooms***

11:00 ***Cockle Bay*** **Kinetic Theory and Transport Properties I** (Chair: J. Kunc)

A new kinetic equation for dense gases. Alejandro L. Garcia and Wolfgang Wagner (2012)

Diffusion Slip for a Binary Mixture of Hard Sphere Molecular Gases: Numerical Analysis based on the Linearized Boltzmann Equation, Shugeri Takata and Kazuo Aoki (1023)

The ES-BGK Model Equation with correct Prandtl number, Pierre Andries and Benoit Perthame (2015)

Quay **Rarefied Flow Studies I** (Chair: M. Gallis)

Hot Oxygen in the Exosphere of Venus, Bernie D. Shizgal (15002)

Asymptotic Behavior in Rotating Rarefied Gases with Evaporation, and Condensation, Liliana M. G. Cumin, Gilberto M. Kremer and Felix Sharipov (1026)

12:00 ***Lunch***

13:00 ***Cockle Bay*****Invited Lectures** (Chair: K. Nanbu)

Particle Simulations for Microelectronics Manufacturing Operations , D.J. Economou (3)

Prediction of plasma damage to nanometer scale device structure during etching using two-frequency capacitively coupled plasma, T. Makabe (4)

14:00 ***Cockle Bay*****Plasma Flows and Processing I** (Chair: I. Wysong)

Diamond Atomic-Scale Simulation of Plasma-Assisted Deposition of -Like Carbon Films, V. V. Serikov, S. Kawamoto, C. F. Abrams, and D. B. Graves (14019)

Full Simulation of Silicon Chemical Vapor Deposition Process, Y. Sakiyama, S. Takagi, Y. Matsumoto (4012)

Monte Carlo Modeling of YBCO Vapor Deposition, Jing Fan, Iain D. Boyd, Chris Shelton (10012)

Quay **Numerical Methods I** (Chair: A. Garcia)

Boltzmann Schemes for the Compressible Navier-Stokes Equations, Taku Ohwada (3012)

Heat Transfer in a Gas Mixture between Two Parallel Plates: Finite-difference Analysis of the Boltzmann Equation, Shingo Kosuge, Kazuo Aoki and Shigeru Takata.(3014)

Darling**Posters:-**

Plasma Flows and Processing P

Measurement of Plasma Parameters in an Inductively Coupled Plasma Reactor, Hiroshi Sasaki, Kenichi Nanbu and Masayoshi Takahashi (14009)

Electron and Vibrational Kinetics in Supersonic Nozzle Expansion G.Colonna, I.Armenise , M.Capitelli, D.Giordano (14013)

Hybrid Particle-Fluid Simulation of Low-Pressure DC Magnetron Discharges, Hirohiko Iwase, Vladimir V. Serikov, and Shinji Kawamoto (14015)

Assessment of CEX ion backflow of SPT-100 thruster, E.A. Bondar, V.A. Schweigert, G.N. Markelov, and M.S. Ivanov (14021)

Jets, Plumes and Propulsion P

Model of translational–rotational relaxation in free jets of polyatomic gases, Alexander V. Lazarev, Nina N. Zastenker and Dmitriy N. Trubnikov (13001)

DSMC Calculation of Supersonic Free Jets from an Orifice with Convex and Concave Corners, Masaru Usami and Koji Teshima (4013)

15:00 ***Afternoon BreakDarling Rooms***

15:30 ***Cockle Bay*****Rarefied Flow Studies II** (Chair: B. Shizgal)

Information Preservation Method for the Case of Temperature Variation, Shen, C. , Jiang, J. Z. and Fan, J. (11001)

A Compressible Turbulent Flow in a Molecular Kinetic Gas Model, Akira. Sakurai and Fumio Takayama (3005)

Equilibrium temperature of small body in shearing gas flow, Lars H.Soderholm. (1028)

Quay **Particle Models and Procedures I** (Chair: T. Bartel)

Timestep Dependence of Transport Coefficients in the Direct Simulation Monte Carlo, Nicolas G. Hadjiconstantinou (4011)

A Particle-Only Hybrid Method For Near Continuum Flows**,** M. N. Macrossan (4025)

Molecular Dynamics Simulation of Unsteady Diffusion, Isaac Greber, Carolyn Sleeter, Ilyas Kandemir (4027)

Darling**Posters:-**

Kinetic Theory and Transport Phenomena P

Particle Transport in Inelastically Scattering Media, Spiga (1016)

Improperly Posed Problem in the Chapman-Enskog Method, Irina Sokolova (1018)

Collision Rates for Many Body Encounters, A. A. Agbormbai (1013)

H Theorem for Many Body Collisions, A. A. Agbormbai (1012)

H Theorem for Vibrationally-Excited Many Body Collisions, A. A. Agbormbai (1014)

Short-Time Expansion for the Analysis of Electron Transport in Molecular Gases**,** Takeo Nishigori (1022)

A Parameterization of Collisions in the Boltzmann Equation by a Rotation Matrix and Boltzmann Collision Integral in Discrete Models of Gas Mixtures, Vladimir L. Saveliev (2010)

Group Classification of Invariant Solutions of the Full Boltzmann Equation, Y.N.Grigoriev and S.V.Meleshko (2014)

A Technique for Developing an Entropy Consistent System of Second-Order Hydrodynamic Equations, Ramesh Balakrishnan and Ramesh K. Agarwal (2011)

Multiphase Flows P

Semi-empirical boundary conditions for strong evaporation of a polyatomic gas., P.A. Skovorodko (8017)

Molecular exchange at an interphase, R. Meland (12015)

Intense Evaporation of a Molecular Gas From a Spherical Surface into a Vacuum, I.A. Kuznetsova, A.A. Yushkenov and Y.I. Yalamov (8003)

Tuesday 11th July

08:30 ***Cockle Bay*Plasma Flows and Processing II** (Chair: D.J. Economou)

On the Coupling of Collisional Radiative Models and Boltzmann Equation for Atomic Transient Hydrogen Plasmas, G. Colonna, D.Pietanza and M.Capitelli (13015)

Calculations of Ion Distribution Functions in Hall Thrusters, L. Garrigues, I.D. Boyd, and J.W. Koo (14002)

Particle Simulation of CH4/H2 RF Glow Discharges for DLC Film Deposition, K. Nagayama and B. Farouk (14007)

Particle Modeling of Plasma and Flow in an Inductively Coupled Plasma Reactor, K. Nanbu and M. Shiozawa (14010)

Modeling of droplet evaporation from a nebulizer in an inductively coupled plasma, C.M. Benson, S.F. Gimelshein, D.A. Levin, and Akbar Montaser (8016)

Velocity distribution of ions incident on a radio-frequency baised wafer, K. Nanbu and G. Wakayama (14011)

Quay **Multiphase Flows** (Chair: S. Knuth)

Transient to steady evaporation and condensation of a vapor between the cylindrical phases – Navier-Stokes and Boltzmann Solutions, Yoshimoto Onishi, Ooshida Takeshi and Tomohiro Tanaka. (3013)

Boundary condition at a gas-liquid interphase, R. Meland and T. Ytrehus (4030)

The Role of Evaporation and Condensation Coefficients in Interphase Transfer, T. Ytrehus and R. Meland (16004)

Structure of Shock Wave in a High Molecular Vapor, Hiroyuki Ogawa, Yasunori Kobayashi, Naruhito Nishikawa and Takeshi Yoshida (16005)

Experimental Study of Condensation Coefficient and Slip Boundary Condition in He II Evaporation, M. Maki, T. Furukawa and M. Murakami (5005)

Formation and propagation of a shock wave due to evaporation processes at imperfect interfaces, Yoshimoto Onishi, (3004)

10:30 ***Morning BreakDarling Rooms***

11:00 ***Cockle Bay*Thomas Lecture** (Chair: T.J. Bartel)

Applications of Low Density Flow Techniques and Catalytic Recombination at the Johnson Space Center, C. Scott (2)

12:00 ***Lunch***

13:00 ***Cockle Bay*****Invited Lectures** (Chair: C. Cercignani)

The Behavior of a Vapor-Gas Mixture in the Continuum Limit: Asymptotic Analysis Based on the Boltzmann Equation, K. Aoki (5)

Electronic Processes in Gases and Plasmas, J. Kunc (12)

14:00 ***Cockle Bay*****Experimental Devices and Procedures for RGD** (Chair: J.K. Harvey)

A Test Facility for Hypervelocity Rarefied Flows, M. N. Macrossan, H-H. Chiu and D. J. Mee (5004)

Spectroscopic Study of REMPI for Rotational Temperature Measurement in Highly Rarefied Gas Flows, Hideo Mori, Toshihiko Ishida, Yoshinori Aoki and Tomohide Niimi (5003)

Precursor electron density measurement ahead of strong shock waves, Kazuhisa Fujita, Atsushi Matsuda, Shunichi Sato, and Takashi Abe (13007)

Quay **Numerical Methods II** (Chair: T. Ohwada)

Eu's Generalized Hydrodynamics as the Basis of a New Computational Model for Rarefied and Micro-scale Gasdynamics, R.S. Myong (3001)

The velocity distribution function in an infinitely strong shock wave, Shigeru Takata, Kazuo Aoki and Carlo Cercignani (3011)

Darling**Posters:-**

Gas-surface Interactions P

Excitation and neutralization of C60 cluster by surface collision, A.A. Vostrikov, D.Yu. Dubov and S.A. Psarov (8013)

Configuration Aspects in Normal Momentum Transfer Study, Philippe J. Polikarpov, Sergei F. Borisov (12001)

Chemical interaction of helium atoms in ionic crystals, Kupryazhkin A.Ya., Zhiganov A.N., Dudorov A.G. (12004)

Determination of interaction potentials in gas-ions systems from measurements of the gas diffusion and solubility in ionic crystals, Kupryazhkin A. Ya. and Nekrassov K. A. (12005)

Stochastic simulation of a gaseous bubble formation in thin surface layer of solids, Anna L. Bondareva and Galina I. Zmievskaya (12018)

Second Order Phase Transition using Stochastic Simulation and Surface Microstructure Formation, Anton V.Ivanov and Galina I.Zmievskaya (12020)

Ray Models of Gas Atom - Solid Surface Interaction, R.N. Miroshin and K.S. Tuboltsev (12009)

Microscale Flows P

Numerical Simulation Of The Nanoscale Flows, Svetlana E. Ignatieva, Vladimir P. Memnonov (11007)

15:00 ***Afternoon Break****Darling Rooms*

15:30 ***Cockle Bay*****Gas-surface Interactions** (Chair: C. Scott)

DSMC Simulation with Gas-Surface Interaction Models in Hypersonic Rarefied Flow, Nobuyuki Tsuboi, Yoichiro Matsumoto, (4007)

Slightly Rarefied Gas Flow Over A Smooth Platinum Surface, Kyoyi Yamamoto (12002)

Solving a Controversy In J-Dependent Molecule-Surface Interactions, L.J.F. Hermans , E.J. van Duyn, A.Yu. Pankov and S.Yu. Krylov (12021)

Application of the Cercignani-Lampis Scattering Kernel to Channel Gas Flows, Felix Sharipov (12007)

Quay **Particle Methods and Procedures II** (Chair: M. N. Macrossan)

A Collective Collision Operator for DSMC, Michael A. Gallis (4037)

Pressure Boundary Treatment in Internal Gas Flows at Subsonic Speed Using DSMC Method, J.-S. Wu (4015)

A Cartesian Grid Strategy with Embedded Surfaces for DSMC, Tim Bartel (17099)

Applications of Local Mesh Refinement in DSMC Method, J.-S. Wu and C.-H. Kuo (4016)

Darling**Posters :-**

Chemical Reactions and Thermal Radiation P

Some Non-Equilibrium Phenomena in Kinetics of Chemical Reactions Participating by High Energy Molecules, G.J. Dynnikova, S.F. Gimelshein, M.S. Ivanov, and N.K. Makashev (13016)

Molecular Orbital Analysis on Contribution of H2O to Plasma Reforming Process from CO2 into Fuel-like Species, Seizo Kato, Takehashi Hara, and Aatsuhiko Taniguchi (13003)

Quantum Calculation of Elementary Chemical Reaction Rate Constants, Ashot Gevorkyan, Yuriy Gorbachev, Armen Grigoryan, Ivan Nikitin (13004)

Vibration-Dissociation Coupling in Nonequilibrium CO2/N2 Mixtures, A.V. Eremin, E.V. Kustova, E.A. Nagnibeda, and V.V. Shumova (13009)

State-to-State Kinetic Description of Non-Equilibrium Radiative Gas Flow, A. Chikhaoui and E. V. Kustova (1024)

Internal Flows and Vacuum Systems P

Molecular transition and slip flows in rotating helical channels of drag pump, Young-Kyu Hwang and Joong-Sik Heo (4026)

Improved Model for Viscous Flow through Curved Ducts, N.N.Kalitkin, B.V.Rogov, I.A.Sokolova (10003)

Free Molecular Flow in the Holweck Pump, Petr A. Skovorodko (10006)

Numerical and Experimental Investigations of Channel Flows in a Disk-Type Drag Pump, Young-Kyu Hwang, Joong-Sik Heo and Wook-Jin Choi (10009)

Surface Composition Influence on Internal Gas Flow at Large Knudsen Numbers, Oleg V. Sazhin, Sergei F. Borisov (12019)

Wednesday 12th July

08:30 ***Cockle Bay*** **Clusters, Aerosols and Granular Gases** (Chair: T. Ytrehus)

Kinetic description for a suspension of inelastic spheres - Boltzmann and BGK equations, Cedric Croizet, and Renee Gatignol (2016)

Thermophoresis of Axially Symmetric Bodies, K. I. Borg and L. H. Soederholm (1029)

A 1-D Granular Gas As A Knudsen Gas, Patricio Cordero, Jose Miguel Pasini and Rosa Ramirez (2020)

Stimulated Heterogeneous Nucleation As Evidence That Supercooled H 2 Droplets Are Liquid, E.L. Knuth,, S. Schaper , J.P. Toennies (17032)

Quay **Microscale Flows I** (Chair: T. Makabe)

Challenges of three-dimensional modeling of microscale propulsion devices with the DSMC method, A.A. Alexeenko, R.J. Collins, S.F. Gimelshein, and D.A. Levin (11015)

Nonlinear Filtering for Low-Velocity Gaseous Microflows, Carolyn R. Kaplan and Elaine S. Oran (4023)

Microfilter Simulations and Scaling Laws, David R. Mott, Elaine S. Oran, and Carolyn R. Kaplan (11012)

Analysis of Internal Micro-scale Gas Flows with Pressure Boundaries Using DSMC Method, J.-S. Wu and K.-C. Tseng (11010)

Rarefied gas flow through a thin orifice, Felix Sharipov (10002)

Initial Results From the First MEMS Fabricated Thermal Transpiration-Driven Vacuum Pump, Stephen E. Vargo and E. P. Muntz (11008)

10:30 ***Morning BreakDarling***

11:00 ***Cockle Bay*****Invited Lectures** (Chair: E.P. Muntz)

DSMC/Continuum Hybrid Methods, A. Garcia (7)

Forty Years of DSMC, and now?, G.A. Bird (8)

12:00 ***Lunch***

14:00 - 16:00 ***Harbour Cruise***

Thursday 13th July

08:30 ***Cockle Bay*****Jets, Plumes and Propulsion I** (Chair: A. Ketsdever)

Development of a Novel Free Molecule Rocket Plume Model, Michael S. Woronowicz (2019)

Numerical Simulation of Rarefied Nozzle Plume Impingements, Toru Hyakutake and Michio Nishida (4004)

Comparison Of Monte-Carlo Modeling And Experimental Results Of UV-emission From Engine Exhaust Plume Interacting With Upper Atmosphere, Alexander I. Erofeev, Oscar G. Friedlander, George K. Karabadzhak, and Yurii A. Plastinin, (4024)

Numerical Investigation of Hydrogen Plumes and Comparison with Experiments in STG, Mathis Rosenhauer, Klaus Plahn and Klaus Hannemann (9014)

Spacecraft contamination by jet plume impinging on dusty planetary surface, T. Abe, S. Sato, K. Suzuki, T. Hirotani, Y. Yamamoto (9015)

Quay **Chemical Reactions and Thermal Radiation I** (Chair: E. Oran)

Strong Nonequilibrium Quasi-Stationary Model for Dissociation-Recombination in Expanding Flows, A.Chikhaoui, E.A. Nagnibeda, E.V. Kustova, T.Yu. Alexandrova (13002)

State-to-State Kinetic Theory of Dissociation in Three-Atomic Gases, E.V. Kustova, E.A. Nagnibeda (1001)

Study on Gas Kinetic Algorithm for Flows from Rarefied Transition to Continuum. Zhihui Li and Hanxin Zhang (3016)

Application of molecular dynamics to the DSMC modeling of an OH vibronic spectra, D.A. Levin, and S.F. Gimelshein (4032)

Dynamic Molecular Collision Model for N2 -He Mixture, Takashi Tokumasu, Yoichiro Matsumoto, Kenjiro Kamijo and Mamoru Oike (4017)

10:30 ***Morning BreakDarling***

11:00 ***Cockle Bay*****Invited Lectures** (Chair: M. Ivanov)

Validation of the DSMC method – Any progress?, J.K. Harvey (9)

Species Separation in Rocket Exhaust Plumes and Analytic Plume Modelling, G. Koppenwallner (10)

12:00 ***Lunch***

13:00 ***Cockle Bay*****Invited Lectures** (Chair: I. Boyd)

Monte Carlo Direct (Test-Particle) Simulation of Rotational and Vibrational Relaxation and Dissociation of Diatomic Molecules Using Classical Trajectory Calculations, K. Koura (11)

Rarefied Gas Flows in Microscales: Applications of RGD in MEMS, A. Beskok (6)

14:00 ***Cockle Bay*****Low Density Aerodynamics I** (Chair: M. Gallis)

DSMC Simulations of Shock Interactions About Sharp Double Cones, James N. Moss (4001)

Measurements in Laminar Separated Flows over Cone/Cone and Hollow Cylinder Flare Configurations for DSMC/Navier-Stokes Code Validation, Michael S. Holden (9009)

Rarefaction effects on separation of hypersonic laminar flows, G.N. Markelov, A.N. Kudryavtsev, M.S. Ivanov (4034)

Quay **Chemical Reactions and Thermal Radiation II** (Chair: A. Lemarchand))

The Simulation of Detonations Using a Monte Carlo Method, Lyle N. Long and James B. Anderson (4022)

Direct Simulation Monte Carlo Modeling of High Energy Chemistry in Molecular Beams: Chemistry Models and Flowfield Effects**,** M. Braunstein and I. J. Wysong (4008)

Simulation of Collision of Ionized Flows, Alexey A. Morozov, Mikhail Yu. Plotnikov and Alexey K. Rebrov (14008)

***Darling*Posters:-**

Rarefied Flow Studies P

The Friction Hysteresis Phenomena In Cylindrical Couette Flow Of Fast Rotating Rarefied Gas, Ivanov A.G., Seleznev V.D., Porodnov B.T. and Tokmantsev V.I.(1003)

Exact Solution For Three-Component Gas Diffusion Through Channel, Oleg E. Aleksandrov, Vladimir D. Seleznev (1006)

Simulations of Gas Cloud Expansion Using Multi-temperature Gas Dynamics Model, Virendra K. Dogra, Robert P. Nance, Jeff C. Taylor and Robert E. Erlandson (3015)

Some Features Of The Plane Couette Flow, Petr A. Skovorodko (4018)

Condensation of Carbon Vapour and Evaporation of Carbon Nanoparticles Behind Shock Wave. J.Deppe, A.V.Emelianov, A.V.Eremin, H.Gg.Wagner, I.Zaslonko (8001)

Interaction of Rarefed Gas with Rough Surface in a Channel, O.A.Aksenova, I.A.Khalidov, V.P.Memnonov (10007)

Surface Roughness Influence on Free Molecular Gas Flow in Rectangular Channels, Oleg V. Sazhin Alexander N. Kulev, and Sergei F. Borisov (10014)

Rarefied Gas – Rough Surface Interaction, M.V. Anolik, V.D. Khalidov, and R.N. Miroshin (12008)

Clusters, Aerosols and Granular Gases P

Light-induced Motion of Aerosol Particles in Gas Mixtures, V.G. Chernyak, O.V. Klitenik (8007)

Collision of Water Clusters, S.V. Drozdov and A.A. Vostrikov (8014)

Static Polarizability of Charged and Electron-Excited Alkali Metal Clusters, Kurkina L.I. (8015)

The equilibrium and oscillations of dust grains in a flowing plasma, S. V. Vladimirov and N. F. Cramer (14012)

Evolution of the Cluster's Distribution Function for Nucleation Process under Conditions of Fast Gasdynamics, Yuriy E. Gorbachev, and Ivan S. Nikitin (8002)

Low Density Aerodynamics P

A Thermochemical Nonequilibrium Flow around a Super Orbital Reentry Capsule, Ryoji Doihara, and Michio Nishida (9007)

A 3-D Coupled CFD-DSMC Solution Method With Application To The Mars Sample Return Orbiter, Christopher E. Glass and Peter A. Gnoffo (4003)

Aerodynamic Optimization in Free-Molecular Flow, O.A. Aksenova, I.A. Khalidev, R.N. Miroshin, and S.I. Romanov (9011)

Spectroscopy Measurements in Rarefied Plumes in the Cryopumped Chamber STG, C. Dankert and B.K. Nazari (9008)

15:00 ***Darling*****Afternoon Break**

15:30 ***Cockle Bay*****Jets, Plumes and Propulsion II** (Chair: G. Koppenwallner)

Maintaining Continuous Low Orbit Flight by Using In-Situ Atmospheric Gases for Propellant, Marcus Young , E.P. Muntz, and Joseph Wang (9023)

An Experimental Study of Structure of Low Density Jets Impinging on a Tilt Plate by LIF and PSP, Tetsuo Fujimoto, Kimihiko Sato, Shuji Naniwa,Tomoyuki Inoue, Kouji Nakashima and Tomohide Niimi (5002)

Modelling of N2-thruster plumes based on experiments in STG, Klaus Plähn and Georg Dettleff (9005)

Quay **Rarefied Flow Studies III** (Chair: K. Aoki)

Low Density Heat Transfer to Blunt Cylinders, Awasthi,A., Thaker,I.H.,Kurian,J. and Beylich, A.E. (16003)

New Relations Between Macroparameters In Shock Wave, Alexander I. Erofeev, Oskar G. Friedlander (1020)

Outflow of Gas Mixtures into Vacuum through a Short Slot, Mikhail Yu. Plotnikov and Alexey K. Rebrov (10008)

Macroscopic Relations in Rarefied Shear Flows, Alexander I. Erofeev, Oscar G. Friedlander (1021)

Direct Monte-Carlo Simulations In a Gas Centrifuge, P. Roblin and F. Doneddu (4038)

Darling**Posters:-**

Particle Methods and Procedures P

A Particle Simulation Method for the BGK Equation, M. N. Macrossan (4033)

An Interlaced System for Rigid Rotors, Alfred E. Beylich and Anshuman Awasthi (3007)

Weighting Schemes for a Simulation Physicochemical Kinetics, Nurhat Nurlybaev (4031)

Dynamical and Statistical Modelling of Many Body Collisions Part I: Scattering, A. A. Agbormbai (6006)

Dynamical and Statistical Modelling of Many Body Collisions II: Energy Exchange, A. A. Agbormbai (6007)

Reciprocity Theory of Vibrationally Excited Many Body Collisions , A. A. Agbormbai (6013)

Reciprocity Modelling of Vibrationally Excited Four Body Collisions, A. A. Agbormbai (6014)

Many Body Collisions under an External Force, A. A. Agbormbai (6015)

Numerical Methods P

Domain Decomposition Method for 2-D Plane Flows with the use of Boltzmann and Navier-Stokes Equations, S.P.Popov and F.G.Tcheremissine (3010)

Solutions of the Boltzmann equation with parallel computations for unstable jet fows, V.V. Aristov, and S.A.Zabelok (3017)

An approach for solving the Boltzmann equation with the use of numerical series, V.V. Aristov (3018)

To Laminar-Turbulent Transition in Relaxing Molecular Gases. Yurii N. Grigoryev and Igor V. Ershov (13008)

(Possibly) Related Subjects P

Superthermal Particles Near the Spacecraft Surface in the Earth's Upper Atmosphere, Valery I. Shematovich (17054)

Characteristics of Gaussian and Laguerre-beams truncated by circular apertures, A. Belafhal (17050)

Frequency domain analysis of thermodynamic losses due to the irreversibility of thermal conduction, Mohammed Beihaqi (17051)

Application of the Method of the Finite Differences to the Non-destructive Characterization of the Planes Defects, Sougrati Belattar (17052)

Application of in-situ measurements to the determination of the thermal admittance of a wall, Sougrati Belattar (17055)

19:00 – 24:00 ***WatersEdge RestaurantSymposium Banquet***

Friday 14th July

08:30 ***Cockle Bay*** **Low Density Aerodynamics II** (Chair: D. Campbell)

DSMC Calculation of Supersonic Expansion at a Very Large Pressure Ratio, K. Teshima and M. Usami (1028)

Aerodynamics of Space Station ``MIR'' during Aeroassisted Controlled Descent, Markelov G.N., Kashkovsky A.V., Ivanov M.S.(9019)

Evaluation of Modified Kotov Analysis Method for Rarefied Transitional Flow Aerodynamics, G. T. Chrusciel and D. A. Kudlick (9002)

3D DSMC Simulation of Rarefied Hypersonic Flow over a Sharp Flat Plate, H. Yamaguchi, N. Tsuboi, and Y. Matsumoto (4009)

Hypersonic Flow around a Sphere with CLL Model of Incomplete Energy Accommodation, Liu, H. L., Shen, C. (12003)

Quay **Microscale Flows II** (Chair: A. Beskok)

Prediction of Mixing of Two Parallel Gas Streams in a Microchannel Using Direct Simulation Monte Carlo Method, F. Yan and B. Farouk (4005)

Solution Of The Blasius Boundary Layer With Slip Flow Conditions, Michael J. Martin and Iain D. Boyd (11006)

Microchannel Flow with Diaphragm, Liu, H. L., Xie, C., Shen, C., and Fan, J. (11002)

Molecular Dynamics Simulation of Molecular Gas Flows In Pores, J. Blömer (11004)

Numerical Study of 2D/3D Micronozzle Flows, G. Markelov and M. Ivanov (11014)

Assessment of Information Preservation Methods for Computing MEMS Flows, Quanhua Sun, Iain D. Boyd, and Jing Fan (11023)

10:30 ***Morning BreakDarling***

11:00 ***Cockle Bay*** **Invited Lectures** (Chair: L. J. F. Hermans)

Macroscopic Effects of the Perturbation of Particle Velocity Distribution in Chemical Wave Fronts, A. Lemarchand (13)

Nonequilibrium Processes at Evaporating and Condensing Surfaces , A.K. Rebrov (14)

12:00 ***Lunch***

13:00 ***Cockle Bay*** **Internal Flows and Vacuum Systems** (Chair: A.K. Rebrov)

Investigation of the Unique Cryogenic Pumping System in the CHAFF-IV Spacecraft-Thruster Interaction Facility, Andrew D. Ketsdever, Marcus P. Young, Andrew Jamison, Brian M. Eccles, and E.P. Muntz (10013)

Direct Simulation Monte Carlo Study of Orifice Flow, G D Danilatos (4019)

3D Flow Simulation of a Spiral Grooved Turbo-Molecular Pump, Saburo Igarashi (10005)

One-way flow of a rarefied gas induced in a circular pipe with a periodic temperature distribution, K. Aoki, Y. Sone, S. Takata, K. Takahashi, and G. A. Bird (10004)

Experiment on a one-way flow of a rarefied gas through a straight circular pipe without average temperature and pressure gradients, Yoshio Sone, Tsuyoshi Fukuda, Tomokuni Hokazono (1007)

Quay **Kinetic Theory and Transport Phenomena II** (Chair: K. Koura)

Extended Boltzmann Equations for Light Particles Reacting with a Medium, M. Groppi and A. Rossani (2013)

Nonlinear Effects In Gases Due To Strong Gradients, Patricio Cordero and Dino Risso (2017)

Polynomial expansion for the axially symmetric Boltzmann equation and relation between matrix elements of collision integral A. Ya. Ender and I. A. Ender (1005)

Hole burning: a discrete kinetic approach, Alexander Prill, Friedrich Hanser and Ferdinand Schurrer. (1017)

The Fokker-Planck operator as an asymptotic limit in anisotropic media, Mohammad Asadzadeh (1025)

Application of the moment equations to shock-tube problem, Takeo Soga (2021)

15:00-17:00 ***Darling*** ***Farewell Party***